The "Skunk Cabbage" of California rejoices in the name of *Lysichiton Kamtschatcensis.*

Lemna Torreyi of the Manual is *L. Valdiviana*, Philippi; and we are reminded that *L. polyrrhiza* was long since changed to *Speirodela polyrrhiza.*

Two genera of palms are described, *Washingtonia* and *Erythea.*

Of the genus *Carex* we find 78 species, some 10 or 11 being described here for the first time by Mr. Wm. Boott.

We confess to a good deal of interest in looking over the *Gramineæ* by Dr. Geo. Thurber. Not so many changes appeared as we had anticipated and we were glad to see that the ordinary terms were employed and not those involving theoretical views of the structure of the flowers. Several new species are well distributed among as many genera. *Brizopyrum spicatum* appears as *Distichlis maritima.*

Ophioglossaceæ appears as an order distinct from *Filices.* The progress in our knowledge of the classification of Ferns has been noted from time to time in reviews of Prof. Eaton's great work.

The genus *Azolla* instead of, as usual, appearing under the order *Marsiliaceæ*, is separated under the order *Salviniaceæ.*

That the flora of California has not been exhausted is witnessed by the fact that during the four years that have elapsed between the publication of the two volumes, new material enough has been collected to make over 60 pages of "Additions and Corrections." In these 60 pages of course we find the very latest information. The California *Trautvetteria* is made a distinct species and now the genus stands with three species, one on the Atlantic coast, one on the Pacific, and one in Japan. A new species is described under *Dicentra*, *Corydalis*, *Trifolium*, *Rosa*, while *Draba* has three additions. A new genus of *Cruciferæ* is dedicated to Mr. Leland Stanford, one of the patrons of the "Botany of California." It is called *Stanfordia.* A good many *Compositæ* are added, largely the result, we suppose, of Dr. Gray's recent study of that vast order. On page 485, *Erythea*, Mr. Watson's genus of Palms, is unfortunately printed *Erythrea*, which makes it look too much like *Erythræa.*

All botanists should possess this complete work which is exceedingly cheap when we consider the matter and workmanship. By addressing Mr. Sereno Watson at Cambridge, Mass., botanists can procure either or both volumes at $5.00 each. – J. M. C.

FRANCIS DARWIN ON PHYSIOLOGY OF PLANTS.—Abstracts of two important papers read by Francis Darwin before the Linnean Society, appear in *Nature* for Dec. 23.* "Both bear on the relationship between the external and internal conditions of life, between external forces such as light and gravitation, and the constitution of the organism on which these forces act."

I. The behavior of leaves under the action of light may be illus-

*I. "The Power possessed by Leaves of placing themselves at Right Angles to the Direction of Incident Light." II. "The Theory of the Growth of Cuttings, illustrated by observations on the Bramble, *Rubus fruticosus.*"

trated by the cotyledons of the seedling radish. If illuminated from above they take a horizontal position, standing thus at right angles to the light. If lighted obliquely from above one becomes depressed and the other elevated, so as to assume again the position at right angles to the incident light.

The two theories which have been proposed to account for this tendency bear the names of Frank (1870) and de Vries (1872), the latter endorsed by Sachs, with modifications, in 1879. Frank supposes a certain sensitiveness to light, which he calls "transverse-heliotropism," to be an inherent tendency in leaves and some other parts of plants, which causes them to assume a position at right angles to light, just as heliotropism inclines them to parallelism with the rays. A similar difference is shown in the tendency of aerial stems to grow upward, and of rhizomes to grow horizontally.

De Vries considers that the ordinary forces of heliotropism and geotropism may so balance each other as to keep horizontal the leaves of a plant lighted from above. Modes of growth may also assist in maintaining this equilibrium. For instance epinasty may be opposed by heliotropism and hyponasty by geotropism.

Darwin's experiments were made with a view to test these two theories. In order to be rid of the disturbing element, the force of gravitation, he used the klinostat, an instrument in the use of which the plant is fastened to a horizontal spindle and illuminated from the direction of the axis. By clockwork the spindle is kept in steady but slow rotation. If a plant which has been previously illuminated from above be fastened with its axis parallel to the axis of the klinostat, and the direction of the incident light, according to Frank's theory the leaves ought to remain stationary, but according to de Vries and Sachs they ought *not* to be able to retain the rectangular position. The results with *Ranunculus ficaria* were decidedly in favor of Frank's theory. The leaves of this plant, which are sometimes extremely epinastic, moved forward until approximately at right angles to the light and then came to rest. Again, when the plant had been placed in the dark so as to compel the leaves to point upwards, and then placed on the klinostat, the leaves turned backward till again at right angles.

A series of experiments with seedling cherries seemed to lead to a somewhat different result. When placed on the klinostat the leaves were unable to keep their horizontal position, but became parallel to the stem of the plant.

He concludes that transverse-heliotropism is really the important influence at work, and that this sensitiveness to light is sufficiently strong in the case of the Ranunculus to determine the position of the leaves, notwithstanding the annihilation of heliotropism. The cherry, when growing normally, he believes to trust to the approximate equilibrium between epinasty and heliotropism, which is made complete by the influence of light. "But when the balance is disturbed by placing the plant on the klinostat, the light stimulus is not strong enough to produce a condition of equilibrium."

II. The second paper considers the two theories to explain the tendency of cuttings to produce roots near the *basal* end,* and buds near the *apical* end. Vochting ("Organbildung im Pflanzenreich," Bonn, 1878) believes this tendency to be innate, and growth-inherited. Sachs, in a late paper (Arbeiten des bot. Inst. Wurzburg, 1880, p. 452) opposes the theory of Vochting *in toto* and conceives that Vochting's morphological force is really a tendency impressed upon the forming cells by the action of external agencies, especially that of gravity.

Darwin observed carefully the rooting of the species of the sterile shoots of brambles growing on steep banks. In such positions the majority of the branches grow immediately downward or straggle out horizontally and then turn downward. But some grow uphill, yet he finds the tips of many of these branches, indifferent as to position, taking root. The gravitation impulse therefore seems not to be applicable to such a case. Mr. Darwin then proceeds to show that it is better for the plant that the morphological growth-impulse should determine the formation of roots at the tip than that root formation should depend on the guiding force of gravity. Injury is most likely to occur at the end of the branch. The new shoot that is to be produced to perform the function of the original branch will have the best chance of success if it starts from the point reached by that branch before the injury; therefore the growth of the bud nearest the apex is the most advantageous for the plant.

It must be remarked that some of the conclusions drawn, if Mr. Darwin is correctly reported by *Nature*, do not seem warranted by the result of the experiments, but it would be hardly just to criticise a paper from a mere abstract.– C. R. B.

PERONOSPORA VILICOLA, DeBary. –American grape vines having been introduced into Europe, with the expectation that they would better withstand the attacks of *Phylloxera*, have carried this parasite with them, and within two years it has spread over all the vine growing countries.

It was first found in Hungary in 1877; in 1878 in South-western France; in 1879 it occurred in a number of provinces, and in 1880, everywhere, doing immense damage. In 1879 it was discovered in Italy and Switzerland, and in 1880 in Tyrol, Steyermark and Lower Austria. *Vide Hedwigia.* – E. W. HOLWAY.

A NEW GRASS.–While on a botanical trip with my friend H. N. Mertz around Lake Chautauqua, N. Y., last summer, we found on a road at Fairpoint upon the "Association grounds" a grass which puzzled us considerably. It was an annual with tufted, linear root leaves 4-5 inches long; slender, leafy culm 15-18 inches high, ending in a narrow spike about two inches long, consisting of numerous 5–6 flowered spikelets each enclosed *within two ovate pinnately-divided bracts* (*glumes?*).

*That end originally nearest the body of the parent plant.